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Stated Meeting, August 19, 1870,

Present, four members.

Vice President, Prof. J. C. CRESSON, in the Chair.

A letter of acknowledgement was received from the Royal Society of London.

Donations for the Library were received from the Societies at Moscow, Offenbach, Bonn, Strasbourg, Lausanne, Salem and Worcester; the Academies at St. Petersburg, Copenhagen, Vienna, and Chicago; the Observatory at St. Petersburg; the Geological Societies at Vienna, Berlin and Florence; the Hospital at Rome; the Royal and Zoological Societies in London; the Royal Society in Dublin; the Oriental Society, and Yale College at New Haven; the Franklin Institute, and Medical News at Philadelphia; the Freedmen's Bureau and Howard University; Herr Dümichen of Berlin; Sig. Dora d'Istréa of Athens; Dr. Andrews of Chicago, and Mr. Edmund Quincy of Boston.

The death of Mr. Samuel V. Merrick, a member of the Society, was announced by Prof. Trego, as having occurred at Philadelphia on the 18th inst., in the 70th year of his age. On motion, Dr. D. R. Goodwin was requested to prepare an obituary notice of the deceased.

The death of Sir James Copeland, M. D., a member of the Society, was announced as having taken place in London, July 14, in the 77th year of his age. Dr. Pepper was appointed to prepare an obituary notice of the deceased.

Prof. Cope communicated a paper entitled "Eighth Contribution to the Herpetology of Tropical America." (See Proceedings, below.)

Prof. Cope communicated a paper entitled "Contribution to the Ichthyology of the Marañon." (See Proceedings below.)

Prof. Cope communicated certain statements concerning *Liodon perlatus*, Cope; and the results of his studies of the Crania of the orders of Reptilia and Batrachia recent and extinct.

Prof. Cope stated that he had been acquainted for some time with a Mososauroid reptile from the white rotten limestone of Alabama, and had formerly thought it to be the *Mososaurus brumbyi*, of Gibbes. He was satisfied of the error of this determination, and as the hæmal arches of the caudal vertebræ were not co-ossified, he referred it to the genus Liodon, under the name of *L. perlatus*. A dorsal vertebra had been already described in the Synopsis of Extinct Batrachia and Reptilia of North America, Trans. Amer. Philos. Soc., 1869, 198.

Prof. Cope communicated some results of his studies of the structure of the crania of the orders of Reptilia and Batrachia, recent and extinct. He explained the characters of the Ichthyopterygia as follows:

The *quadratojugal* present (squamosal of Owen, Anatomy of the Vertebrata); *postorbital* (of Owen) present.. The *squamosal* (supratemporal of Owen) extending over the inner side of the parieto-squamosal arch so as to conceal the parietal portion of it, to the anterior part of the temporal fossa, and in contact with its fellow of the other side. It sends down a columella to the pterygoid. It extends also for a remarkable distance downwards behind the osquadratum. ? *Opisthotic* present. A distinct element exists behind the quadratum, which he thought might be the *suprastapedial*, otherwise called the incus, or hyomandibular, according to Huxley. The pterygoid prolonged backwards and expanded, in contact with the basi-occipital, and extending from it to the quadratum. The posterior pair of elements of the superior face of the cranium being determined to be squamosals, the interpretation of the anterior elements becomes simple. The rhombic element with fontanelle is parietal (frontal of Owen Anatomy of Vertebrata), and the preceding pair are the frontals (nasals, Owen). The true nasals were shown to lie at the proximal end of the nares.

The structure of the suspensorial region in the Anomodont, Lystrosaurus, was next pointed out. In this order there is no quadratojugal arch, and the zygomatic arch contains a very small postorbital. The *squamosal* has an extraordinary development, and extends on the parieto-quadrate arch, and on the inner side of the temporal fossa on each side of the parietal. The *parietal* is not so far concealed as in Ichthysaurus, but its posterior-lateral process may be seen wedged in between the squamosal and the thin, plate-like opisthotic, which lies external to the supraoccipital on each side. The *opisthotic* is the parietal of Owen, and the parietal branch of the squamosal is the mastoid of the same author.

This branch in Ichthyosaurus and Lystrosaurus is continuous with the zygomatic portion of the bone, though another element might have been originally coössified with it. The posterior portion of the squamosal is prolonged remarkably, it is applied to the posterior face of the quadratum, and extends to its articular extremity. The *quadratum* is a small bone of a plate-like form, in contact with the squamosal above and the ? proötic inwardly and anteriorly. *Suprastapedial* not distinguished. The parietal branch of the squamosal sends down a *columella* to the pterygoid.

The *proötic* is a distinct though small bone, below and in front of the squamosal. The presphenoid is plate like, and much as in the Crocodilia.

Prof. Cope thought that the Anomodontia, one of the earliest (Triassic) types of Reptilia are one of the best examples of a generalized group among the vertebrata. Thus the structure of the posterior part of the Cranium is largely that of Ichthyopterygia, and partially that of Lacertilia; of the oral parts of the cranium, the proötic and mandible, of Testudinata. The vertebral characters are partly those of Ichthyopterygia, and the sacrum and rib articulations those of Dinosauria. The peculiar presphenoid is characteristic of Crocodilia, and the osseous interorbital septum, of the Rhynchocephalia.

The position of the posterior plate of the squamosal in Ichthyopterygia and Anomodontia seemed conclusive as the homology of that element with the bone covering the cartilaginous quadratum in Batrachia Anura, and the osseous quadratum in Urodela and Dipnoi, called tympanique by Cuvier, and temporo-mastoidean by Dugès. This bone had been already homologized with the preoperculum of Teleostei by Huxley, and it is thought that its present determination in the Reptilia established the serial homology of the preoperculum of the fish with the squamosal plate of the mammal.

Prof. Kirkwood communicated a paper "On the Mass of the Asteroids between Mars and Jupiter." (See Proceedings below.)

Prof. Cresson described the thunder storm of the 4th inst. at the Belmont Water Works.

And the Society was adjourned.

On the MASS *of* ASTEROIDS *between* MARS *and* JUPITER. By PROFESSOR DANIEL KIRKWOOD, Bloomington, Indiana.

According to Leverrier, the total mass of the ring of minor planets does not exceed $\frac{1}{4}$th of the earth's mass, or $\frac{1}{1200}$th of that of Jupiter. So great a disproportion between two adjacent planets is without a parallel. Is the fact susceptible of a probable explanation?

Were the sun transformed into a gaseous spheroid with an equatorial radius equal to the diameter of the earth's orbit, a large number of the known asteroids would, in perihelio, plunge into the solar mass and be reunited with it. Now this, in all probability, is precisely what occurred soon after the abandonment of the asteroid zone, while the solar nebula was in the process of condensation. The powerful mass of Jupiter would produce great eccentricity in parts, at least, of the primitive ring. Large portions of its matter, or a considerable number of minor planets in a state of vapor, may thus have been precipitated upon the sun before the latter had contracted within their perihelion distance. The small mass of Mars may perhaps be accounted for on the same hypothesis.